

U.S. Patent Application Serial No. 09/963,709
Amendment filed April 24, 2006
Reply to OA dated January 23, 2006

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 Claim 1 (currently amended): An optical time-division multiplex signal processing
2 apparatus, comprising:

3 an optical dispersion part supplied with an optical time-division multiplex signal and
4 an optical clock signal via respective, different paths, said optical dispersion part providing optical
5 dispersion to said optical time-division multiplex signal and said optical clock signal;

6 an optical detector coupled optically to said optical dispersion part, said optical
7 detector detecting a beat of said optical time-division multiplex signal and said clock signal from
8 said optical dispersion part in a superposed state; and

9 a filter connected to an output terminal of said optical detector, said filter ~~filtering out~~
10 extracting an electric signal of a desired beat frequency band from an output electric signal of said
11 optical detector.

1 Claim 2 (original): An optical time-division multiplex signal processing apparatus
2 as claimed in claim 1, wherein said optical dispersion part comprises an optical coupler having a first
3 input end to which said optical time-division multiplexed optical signal is supplied and a second
4 input end to which an optical clock signal is supplied, said optical coupler optically coupling said

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5 optical time-division multiplex signal with said optical clock signal therein, and a dispersion medium
6 coupled optically to an output end of said optical coupler, said dispersion medium causing an optical
7 dispersion in said optical time-division multiplex signal and said optical clock signal.

1 Claim 3 (original): An optical time-division multiplex signal processing apparatus
2 as claimed in claim 2, wherein said dispersion medium is selected from any of a single-mode optical
3 fiber, a diffraction grating and a prism.

1 Claim 4 (original): An optical time-division multiplex signal processing apparatus
2 as claimed in claim 2, wherein said optical coupler includes a depolarization element at said second
3 input end.

1 Claim 5 (currently amended): An optical time-division multiplex signal processing
2 apparatus, comprising:

3 an optical dispersion part supplied with an optical time-division multiplex signal and
4 an optical clock signal, said optical dispersion part providing optical dispersion to said optical
5 time-division multiplex signal and said optical clock signal;

6 an optical detector coupled optically to said optical dispersion part, said optical
7 detector detecting said optical time-division multiplex signal and said clock signal from said optical
8 dispersion part in a superposed state; and

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9 a filter connected to an output terminal of said optical detector, said filter filtering out
10 an electric signal of a desired frequency band from an output electric signal of said optical detector;
11 wherein said optical dispersion part comprises an optical coupler having a first input
12 end to which said optical time-division multiplexed optical signal is supplied and a second input end
13 to which an optical clock signal is supplied, said optical coupler optically coupling said optical
14 time-division multiplex signal with said optical clock signal therein, and a dispersion medium
15 coupled optically to an output end of said optical coupler, said dispersion medium causing an optical
16 dispersion in said optical time-division multiplex signal and said optical clock signal ~~An optical~~
17 ~~time-division multiplex signal processing apparatus as claimed in claim 2, wherein said optical~~
18 ~~dispersion part comprises a first dispersion medium supplied with said optical time-division~~
19 ~~multiplex signal, a second dispersion medium supplied with said optical clock signal, and an optical~~
20 ~~coupler coupling said optical time-division multiplex signal passed through said first dispersion~~
21 ~~medium and said optical clock signal passed through said second dispersion medium.~~

1 Claim 6 (currently amended): A processing method of an optical time-division
2 multiplex signal, comprising the steps of:
3 providing a chirp to each of an optical time-division multiplex signal and an optical
4 clock signal supplied via respective paths;
5 detecting said optical time-division multiplex signal and said optical clock signal in
6 a superimposed state; and

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7 detecting extracting a beat component formed between said optical time-division
8 multiplex signal and said optical signal provided with respective chirp.

1 Claim 7 (currently amended): An optical time-division multiplex signal receiver,
2 comprising:

3 an optical dispersion part supplied with an optical time-division multiplex signal and
4 an optical clock signal, said optical dispersion part providing a chirp to each of said optical
5 time-division multiplex signal and said optical clock signal;

6 an optical detector coupled optically to said optical dispersion part, said optical
7 detector receiving said optical time-division multiplex signal and said optical clock signal in a
8 superposed state and detecting a beat formed between said optical time-division multiplex signal and
9 said optical clock signal;

10 a filter connected to an output terminal of said optical detector, said filter filtering out
11 extracting an electric signal of a desired beat frequency band from an output electric signal of said
12 optical detector; and

13 an envelop detector supplied with an output signal of said filter.

1 Claim 8 (currently amended): An optical time-division multiplex receiver,
2 comprising:

3 a first optical dispersion part supplied with an optical time-division multiplex signal

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4 and causing an optical dispersion therein;

5 a second optical dispersion part supplied with an optical clock signal and causing an

6 optical dispersion therein;

7 a plurality of optical detectors each coupled optically to said first and second optical

8 dispersion parts, each of said optical detectors receiving said optical time-division multiplex signal

9 and said optical clock signal in a superposed state, each of said optical detectors producing a beat

10 formed between said optical time-division multiplex signal and said optical clock signal;

11 a plurality of band-pass filters each provided in correspondence to one of said

12 plurality of optical detectors, each of said band-pass filters filtering out extracting an output signal

13 of said optical detector of a beat frequency corresponding thereto; and

14 a plurality of envelop detectors each provided in correspondence to one of said

15 plurality of band-pass filters,

16 wherein said plurality of band-pass filters have mutually different band-pass

17 characteristics.

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1 Claim 10 (original): An optical time-division multiplex receiver, comprising:
2 a first optical dispersion part supplied with an optical time-division multiplex signal
3 and providing an optical dispersion thereto;
4 a second optical dispersion part supplied with an optical clock signal and providing
5 an optical dispersion thereto;
6 a plurality of optical delay elements each coupled to said second optical dispersion
7 part, each of said plurality of optical delay elements inducing a delay in an optical clock signal
8 supplied thereto from said second optical dispersion part;
9 a plurality of optical detectors each coupled optically to said first optical dispersion
10 part and further to one of said plurality of optical delay elements, each of said optical detectors
11 detecting said optical time-division multiplex signal from said first dispersion part and said optical
12 clock signal from said optical delay element;
13 a plurality of band-pass filters each supplied with an output signal of one of said
14 plurality of optical detectors corresponding thereto; and
15 a plurality of envelop detectors each supplied with an output signal of one of said
16 plurality of band-pass filters corresponding thereto.

1 Claim 11 (original): An optical time-division multiplex signal receiver as claimed
2 in claim 10, wherein said band-pass filters have a substantially identical pass-band.

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1 Claim 12 (original): An optical time-division multiplex signal receiver as claimed
2 in claim 11, wherein said plurality of optical delay elements are provided in correspondence to a
3 plurality of channels in said optical time-division multiplex signal, and wherein each of said optical
4 delay elements has a delay time set so as to form a beat signal between an optical signal of a
5 corresponding channel and said clock signal with a frequency corresponding to said pass-band.

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